

**ROOF WATERPROOFING
AT
PLANT AND DSQ (#1 TO #12)**

STATEMENT OF WORK

The U.S. Embassy New Delhi has a requirement to re-store roof waterproofing for plant and domestic quarters.

GENERAL GUIDELINES AND LOGISTICAL REQUIREMENTS

- 1) The Contractor shall provide all required labours, material (except the GFI), equipment, and supervision to complete the project.
- 2) Contractors are recommended to seek clarifications regarding this statement of work and can write the uncleared queries to the contracting office after the walk thru.
- 3) Embassy contracting office will consult with COR and respond to all the queries in writing before the due date of the submission of quotes.
- 4) Embassy expects professional craftsmanship and supervision from the bidders.
- 5) The timeline for this project is 45 calendar days.**
- 6) The contractor must adhere to the safety mandates explained in this document,
- 7) The contractor and his/ her staff must wear Personnel Protective Equipment (PPE) while at embassy construction site.
- 8) No work will be allowed to perform at USG construction sites without the PPEs and the contractor will be accountable for the delays caused due to the safety issues.
- 9) PPEs includes steel toe shoes, protective goggles, hard hats, coveralls and COVID -19 protective masks.
- 10) The contractor shall include the cost of the PPEs and other logistical expenses to manage the safety and PPE guidelines while bidding.
- 11) The contractor will be held responsible and accountable for any deviations from the safety and PPE guidelines specified in this document.
- 12) All work shall be performed by skilled and competent crew.
- 13) The Contractor shall follow security and safety directions as mentioned in the statement of works and explained by the COR.
- 14) The Contractor shall submit the construction bar chart to the COR within 2 working days upon obtaining the letter to proceed from the contracting office.
- 15) The Contractor shall submit all the cut sheets / brochures and material samples for COR approval before delivery of material at site.
- 16) All materials shall be delivered, hoisted on the exterior and stored as per space allotted.
- 17) Contractor shall dispose of all the debris from the site and keep the site clean and in workable condition throughout the project duration.

SCOPE OF WORK FOR ROOF WATERPROOFING OF PLANT AND DOMESTIC QUARTERS

- Remove existing felt layers, roof tiles complete with mortar layer underneath. The contractor shall remove layer of polystyrene insulation to reach up to RCC slab. (app. 13000 sq. ft.)
- Contractor shall do necessary repair to the slab with recommended polymer mortar of SIKKA or Fosrock or equivalent makes.
- After repair of RCC slab, provide a layer of form concrete or mortar layer mixed with waterproof compound (SIKKA LATEX) as per manufacturer instructions, to make slop towards drains on entire slab.
- Remove existing GI roof drainpipes (18 each), located on surface. Provide and install 18 new roof drains and all these drains will be on surface. Drain shall be of 4" dia PVC of supreme makes (10 kg, pressure). New drains will be connected to the manhole and drainpipe on floor shall be concealed. Repair the flooring, matching to existing.
- After curing the mortar layer, install embassy provided bituminous felt (two layers) over the freshly laid bituminous primer with hot bitumen of 85/25-grade spread @ 1.7 kg/sq. mt. Torch-apply by heating membrane in accordance with manufacturer's recommendation to achieve continuous edge flow and complete bond. The terminated end of bitumen membrane shall be done as per site condition requirement.

Note: The longitudinal side of felt shall be overlap minimum 4 inches and end laps minimum 8 inches. All the gaps and overlaps/ joints shall be sealed with hot bitumen.

- **Once mortar dry, contractor shall do the flood test (minimum 48 hrs.) of complete roof after waterproofing. 4" to 5" water shall be standing over the roof after placing the sand bags around to hold the water.**
- On top of the bituminous felt, provide a layer of mortar with chicken wire mesh in between slop toward drain. The slope in foam concrete shall be 2% towards rainwater drains and thickness of mortar shall be minimum 1" and any points.
- The contractor shall provide and lay 300-micron polythene sheet of transparent color over the mortar layer and also over Polystyrene Insulation.
- Install embassy provided PVC drain board, DRENTEx protect 50 of TEXSA/DELTA makes over and above the polythene sheet.
- Install embassy provided 2" (50 mm) thick inter lockable Extruded Polystyrene Insulation over drain board. The insulation will be applied in parallel rows and all sides/end joints will be installed closely but not forced.
- Over the insulation the contractor shall spread Filter Fabric on all over the roof to cover the insulation.
- Install embassy provided pavers on top of filter fabric at every 4'-0" distance center to center. The space between pavers shall be filled with embassy provided marble chips or gravel.

- Provide and install ALUMINUM flashing (14-gauge) at the edges, where felt terminated with necessary anchors and silicon. Aluminum flashing shall be wide as per the width of parapet wall,
- Provide and install drain cover, made of MS bar (1"x 1") and MS screen/wire-mesh (10-gauge, stainless steel-406 grade) for all the drains so that no leaves can pass through.

Note: Contractor is responsible to remove existing solar water heaters during the work and re-install the same once job completed. Contractor is also responsible to make temporary arrangement to supply hot water to the plant and DSQ's during the work.

Existing plumbing line, feeding hot water to the plant as well as all DSQ, shall be removed completely. New plumbing line to be laid (CPVC, Multi Pro pipes) and connect to the existing hot water line available in each bathroom/kitchen and plant room (total 13 places) and make it loop/header to connect with circulation pump. The plumbing line which will be used for loop/header, shall be laid in floor, and connect to the pump, located in pump room. Repair the walls/floors, matching to existing after plumbing line connection.

- **Remove existing layer of felt from overhangs, (900 sq. ft.) and reach up to the RCC slab as repair the roof as per above details. Install embassy provided bituminous felt (3mm thick APP modified elastomeric bitumen, non-woven polyester felt over the all the overhangs, with hot bitumen of 85/25-grade spread @ 1.7 kg/sq. mt. Torch-apply by heating membrane in accordance with manufacturer's recommendation to achieve continuous edge flow and complete bond. The terminated end of bitumen membrane shall be done as per site condition requirement. Provide a layer of aluminum coating over felt. Provide and install aluminum flashing (16 gauge) on the felt terminated at edge of overhang.**

Replacement of roof sheeting of plant Room:

- **Remove existing metal sheeting from plant room completely** without damaging main metal frame.
- **Repair/Raise** the side walls if needed to make the proper slop of new roofing.
- The contractor shall install embassy provided Composite Insulated Roof sheeting (50 mm thick) over the plant room (app. area 1200 sq. ft.) as per manufacturer instructions with hooks and nuts. The J-hooks shall be strapped around existing frame and fixed with GI nuts which contain bituminous washers as per manufacturer instruction. End edges of the puff panels shall be covered/cladding with aluminum sheet of 16-gauge.
- The roof sheets shall be embedded 2" deep, in the side wall. The wall chased, shall be filled with cement mortar with round edge. The new sheeting shall be extended from the supporting wall towards ends. The roofing sheet shall have overlapped each other as per manufacture instructions.
- The roofing shall be supported on existing metal framework. Contractor shall add necessary angle iron frame (2" x 2" x 1/4") to strengthen existing framework.
- The contractor shall paint existing frame before installation of sheets with 2 coats of lead-free enamel paint of white color after providing coat of metal primer of Asian Makes.
- **Install embassy provided bituminous felt (3mm thick APP modified elastomeric bitumen, non-woven polyester felt over the new puff panel sheeting, with hot**

bitumen of 85/25-grade spread @ 1.7 kg/sq. mt. Torch-apply by heating membrane in accordance with manufacturer's recommendation to achieve continuous edge flow and complete bond. The terminated end of bitumen membrane shall be done as per site condition requirement. Provide a layer of aluminum coating over felt.

New overhang required for covering two chiller panel:

Install embassy provided Composite Insulated Roof sheeting (50 mm thick) over the chiller panel (app. area 50 sq. ft.) with necessary metal frame made with 2" dia MS pipe of Jindal makes as per manufacturer instructions with hooks and nuts. The J-hooks shall be strapped around with new frame and fixed with GI nuts which contain bituminous washers as per manufacturer instruction. End edges of the puff panels shall be covered/cladding with aluminum sheet of 16-gauge. Install embassy provided bituminous felt over both overhangs, as per above details.

Warranties

- Contractor's warranty: Furnish a written warranty agreeing to repair / replace defective installation and workmanship causing leakage of water, deterioration of materials and other failures of the installed system, sealants, painting, coatings and related work on this project, to perform as required within the warranty period. **Warranty period is 10 years after date of the written final acceptance.**

MATERIAL PROVIDED BY EMBASSY

Bituminous primer, Bitumen, Bituminous felt, Insulation, drain-tax board, pavers, foam concrete, 300-micron polyethene sheet, filter fabric and Marble chips/gravels, cement/sand/aggregates. Bonding agent/Polymer mortar of SIKKA makes

MATERIAL PROVIDED BY CONTRACTOR

PVC pipe of SUPREME makes (10 kg), Aluminum flashing (14-gauge), drain cage/cover and. Angle iron frame (2" x 2" x 1/4") to strengthen existing framework

Renderoc S2

Two component structural grade polymer modified reinstatement mortar

- Compressive strength 28days 45N/mm²
- Flexural strength 28days 8N/mm²

Nitobond AR

- ♦ Acrylic Emulsion cement modifier and water based concrete bonding agent.
- ♦ Compressive Strength 40 N/sq.mm (wet)
- ♦ Tensile Strength 3.5 N/sq.mm

Materials/Makes

Contractor shall provide sample of all the material as mentioned in above specifications for the approval from COR before using it in the project or before delivery of material at site. **Contractor shall use material of brands or make as given.**

SITE CLEANING

- Contractor shall broom clean the entire site and the storage area after the completion of the project and on each at close of business.
- Contractor will paint the area of the exterior walls or other areas which will be affected during the project matching to existing paint and shade.

CONTRACTOR'S RESPONSIBILITY

- The Contractor shall be responsible for the professional quality, technical accuracy, and the coordination of all construction and other services furnished under this contract. The Contractor shall correct or revise any errors or deficiencies in its construction and other services without additional compensation,
- The Contractor shall identify a Project Manager/Supervisor who shall be responsible for the overall management of this Contract. Project Manager shall be qualified and have the experience in same type of job.
- The Contractor is responsible for safety and shall comply with all local labor laws, regulations, customs and practices pertaining to labor, safety and similar matters. The Contractor shall promptly report all accidents resulting in lost time, disabling, or fatal injuries to the COR.
- The Contractor shall be responsible for connection of temporary utilities to existing utilities including water and power. All temporary connections to local water and power shall be coordinated with the Embassy.
- All expenses towards mobilization at site and demobilization including bringing in equipment, workforce and materials, profit and overheads, dismantling the equipment, clearing the site etc. should be included in the rates quoted by the contractor. No separate payment on such expenses shall be entertained.
- Contractor should keep the site clean and accessible to Embassy employee all time

SAFETY

In addition to the attached Accidental prevention clause contractor will be responsible for

- Any miss-happening at the site due to negligence in the safety measures.
- Contractor will provide all Personal Protective Equipment for the workers as per the requirement of the site. Work will be stopped in case proper protection equipment are not found with the workers and lapse of the time will be at the part of the contractor.
- Contractor will make sure that all the arrangements for the work are working conditions are safe in all respect. Under no circumstance Embassy will be held responsible for any incident happen on the site due to negligence of the contractor / worker.

General Notes

- Once the project starts, it is contractor's responsibility to secure the roof against any kind of seepage / leakage to the floors underneath. Any damage / seepage / leakage

occurred to the slab or to the other parts of the building while project is in progress will be contractor's responsibility and will repair the damages matching to existing.

- Contractor will be responsible for the safety of all the existing wires running on the roof during demolition phase.
- Contractor will provide all the material required to complete the job in satisfactory manner.
- Contractor shall provide and use LPG gas kettle for heating of bitumen. Contractor shall arrange for fire extinguishers while the gas cylinder is in use at the site. Under no circumstance wood will be allowed for heating the bitumen. In case of any miss-happening Embassy will not be responsible.
- Contractor should arrange the visit of the professional in this field from manufacturer side time to time (once or twice throughout the duration of the project) to supervise the project during work in progress.
- One qualified technical supervisor from contractor side should always be present on the site. He should be able to speak and understand English language.
- All demolished material shall be removed from the site, unless otherwise specified, on daily basis. The contractor will be entirely responsible for the disposal of all the trash and debris, and will be the only one to attend to any fine or penalty imposed by city authorities for improper disposal. The contractor shall take all necessary precaution/protection and approval from local authorities for disposal of debris.
- Embassy will provide electrical and water connection at one point. Contractor shall arrange all material and labor for further distribution.

Working Hours

- Working hours shall be 9:00 A.M. to 6.00P.M. Monday to Sunday. No work shall be done on holidays unless otherwise approved. Total 35 working days shall be given.

SAFETY STANDARDS TO BE FOLLOWED AT CONSTRUCTION AND RENOVATION SITES

Contractor:

Work Site Address:

Contractor Safety Officer Name:

Signature for Acceptance by the contractor:

Safety standards to be followed at construction and renovation sites AHA – Activity

Hazard Analysis

1. The contractor must document in the bid for the work how the control of each hazard will be implemented and maintained during the project by submission of a safety plan and activity hazard analysis (AHA) for high hazard activities. The POSHO or qualified Post representative must review the contractor's proposal and provide feedback to the responsible project manager and Contracting Officer prior to acceptance of the bid.
2. Any situation where in the work in progress can pose a threat to the user of work area in emergency, contractor shall ensure proper barricading (sturdy enough for the purpose) to avoid any risk.

Covid 19 Precautions

1. Every worker on site shall wear a mask and gloves all the time.
2. Workers shall maintain social distancing – six feet - all the time.
3. Sanitize or wash your hands frequently.
4. No worker shall be in proximity with other worker for more than 10 minutes and that too with the mask and gloves on.
5. Contractor shall ensure temperature testing of all workers coming on site in the morning and randomly during entire day to make sure that no one is suffering from fever.
6. Any worker showing any symptoms of fever, cough and cold, body ache etc. shall not be allowed to work till he is been ruled out of being positive.

General

1. All workers on the work site must wear safety shoes on construction site. No worker with flip flops will be allowed to work at site.
2. All the workers should wear full clothes. No half pants and other non-appropriate clothing (Dhoti) will be accepted.
3. Malba / trash accumulated on the site should be removed at a regular interval (if possible on daily basis) so that it should not pose any trip hazard.
4. Employee exposed to hazards created by different works environment shall be protected by personal protective equipment. Appropriate protective clothing for any operation varies with the size, nature and location of work to be performed.
5. In extreme hot conditions drinking water must be made available to the worker and working duration in exposed conditions should be scheduled accordingly.
6. It is the responsibility of the contractor to made available all the PPE (Personal Protective Equipment) as per the requirement of the work site and as directed by the COR. Any mishap due to negligence on the part of the contractor will be entirely contractor's responsibility.

Machinist / Welding Jobs

1. Hot work permit is required to be filled for each hot work to be performed on USG site.
2. Contractor shall follow attached standards regarding different type of welding to be done on the site.
3. All workers who are arc welding must use a full face shield with #10 or darker lenses. No worker will be allowed to arc weld with sun glasses, no matter how dark the lenses.
4. All the workers working on grinding and sanding job should have approved face masks and goggles for face and eye protection.
5. Workers handling the heavy metallic material should have appropriate gloves and safety shoes as per the job requirement.
6. Lifting and shifting of the heavy material to be done with the help of appropriate machines.
7. Compressed gas cylinder shall be properly marked and should always be kept in standing positing with guard against fall.
8. Hoses connected to the cylinder should be in good condition.
9. In case Arc welding is done inside the premises proper ventilation should be

- arranged in the vicinity.
10. Contractor should use welding shield during the work to protect the people around against any potential vision hazard.
 11. Always keep an approved fire extinguisher near the site of welding.
 12. Workers working with metal sheets must wear appropriate gloves to avoid any cuts on the hands or mishap on the site.
 13. Electrical connections for the welding set and the grounding for the same shall be done properly to the satisfaction of the embassy electrician. Please refer electrical section in the document.

Ladders Safety

1. Contractor will use aluminum or fiber glass ladders for all purposes. Wooden ladders are not allowed on the site.
2. Proper ladder for a specific job should be used (for example fiber glass ladders for electrical work etc.).
3. Damaged ladders or ladders with missing supports, shoes etc should not be used on the site.
4. Height of the ladder should be at least two feet above the required height for the work.

Electrical

1. All the equipment / machines to be used for the execution of the job should be properly grounded.
2. All the extension boards to be used at the site should have proper earthing.
3. All connections to any of the outlets should be through three pin plug. Direct connection of wires is not allowed on the site.
4. Damaged wiring/ cabling for the machines / tools to be used at site are not acceptable. The extension cord or wire with the machines should be one core.
5. Electricians working on the site should wear shoes with rubber soles and should use rubber gloves during execution of the work.
6. Any heavy equipment to be plugged in for the work should be done under supervision of the embassy electrician. Contractor on his own should not plug in heavy equipment.
7. No taped joint or undersize wiring is allowed at the site for the work.

Carpentry

1. Carpenters should have dust mask to protect them from the potential hazard from saw dust. In case sanding machine is used at the site the machine should have proper guards and operator should have suitable PPE (personal protective equipment) with them. For e.g. safety goggles, safety shoes, gloves etc.
2. All the wood to be used at the site should be properly stacked at one side. It should not be scattered around and pose a threat for a trip hazard.
3. Entire site should be kept clean from the saw dust at the end of the day.
4. Carpenter shall use machine guards if at all machines are used at the site.
5. All the care should be taken to protect the flooring against any kind of potential damage.

6. All the drill machines or other electrical tools to be used at the site should be properly grounded and wired.
7. Contractor should use proper tools and tackles for the execution of the work at site.
8. Nails and other sharp material which can pose a threat of accident should not be scattered on the site.

Fire

1. Contractor shall provide and place fire extinguishers as per the requirement of the site (as recommended by the COR).
2. No flammable material should be kept inside the premises at any given point of time.

Lock Out / Tag Out

1. Lock out devices should be used during the testing of the electrical points and wiring.

Confined spaces

1. If at all contractor has to work in a confined space he should contact the COR before proceeding with the work. Contractor should arrange all the equipment as instructed by the COR to accomplish the job in a safe manner.

Hearing Protection

1. Contractor should assure that all the workers working in noisy surroundings should wear ear muffs or other approved devices.

Height Protection

1. Any work to be carried out over and above 8'-0" needs a sturdy metal pipe scaffolding to carry out that work. Ladder or any other arrangement needs to a preapproval from COR to be implemented on the site.

For any further clarification please contact POSHO (Post Occupational Safety and Health Officer) at # 011-24198280 OR APOSHO Mr. Rohit Soni at 011-24198682.